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The "Check*Tools*" Perspective

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Building Energy Codes Program
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Purpose and Mission

Why do we do this?

42 USC 6833 (in part): … **Technical assistance:** The Secretary shall provide technical assistance to States to implement the requirements of this section, and to improve and implement State residential and commercial building energy efficiency codes or to otherwise promote the design and construction of energy efficient buildings. …

How do we do this?

- Provide technical assistance to states to implement national energy codes
- Provide software support to states to implement state energy codes
- Provide assistance increasing and verifying compliance
- Develop software to support a streamlined compliance process
- Provide objective information resources and technical guidance to states and localities to increase code compliance.

History

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Early desktop software supported:

REScheck:

- MECcheck 1994: Supported Model Energy Codes 1992+, IECC 1998+
- Developed for and used by:
  - U.S. Dept. of HUD
  - Rural Econ. and Community Dev. (formerly Farmer's Home Admin)
  - CABO MEC users

COMcheck:

- COMcheck-EZ (1997) - True Windows version released 1998
- COMcheck-Plus – 1999 – DOE-2 Limited Performance Simulation
- COMcheck 4.0.0 released 2015

Web presence:

- Energy Codes website started late 90's – platform for information and desktop tools
- REScheckWeb 2001
- COMcheckWeb 2002

History (cont.)

Past and Present "Support Tools" :

- Package Generator
- "Score 'N Store"
- U-factor calculator
- CodeCheck
- Energy code Tax credit app (https://energycode.pnl.gov/EnergyCodeReqs/)
- Lighting fixture library (COMcheck only)
- "AreaCalc" (REScheck only)
- Fan system compliance "wizard" (commercial only)
- Data exchange of project files between desktop and web
- Inspection checklists (UI interactive format and PDF)

Currently Supported Energy Codes

National Codes: 3 code cycle support

- RES: IECC 2009/2012/2015
- COM: IECC 2006/2009/2012, ASHRAE 90.1-2007/2010/2013

State codes:

Adoption Criteria

- Based on latest national code in the software
- More stringent than the base national code
- Advances code coverage/adoption that can be leveraged by other state codes

State Code Challenges:

- Alignment of state code adoption and CheckTools development or 3 code-cycle
- Grace periods allowed by state codes don't play well with web apps
- State energy code requirements can be contradictory and/or poorly defined

Currently Supported State Energy Codes

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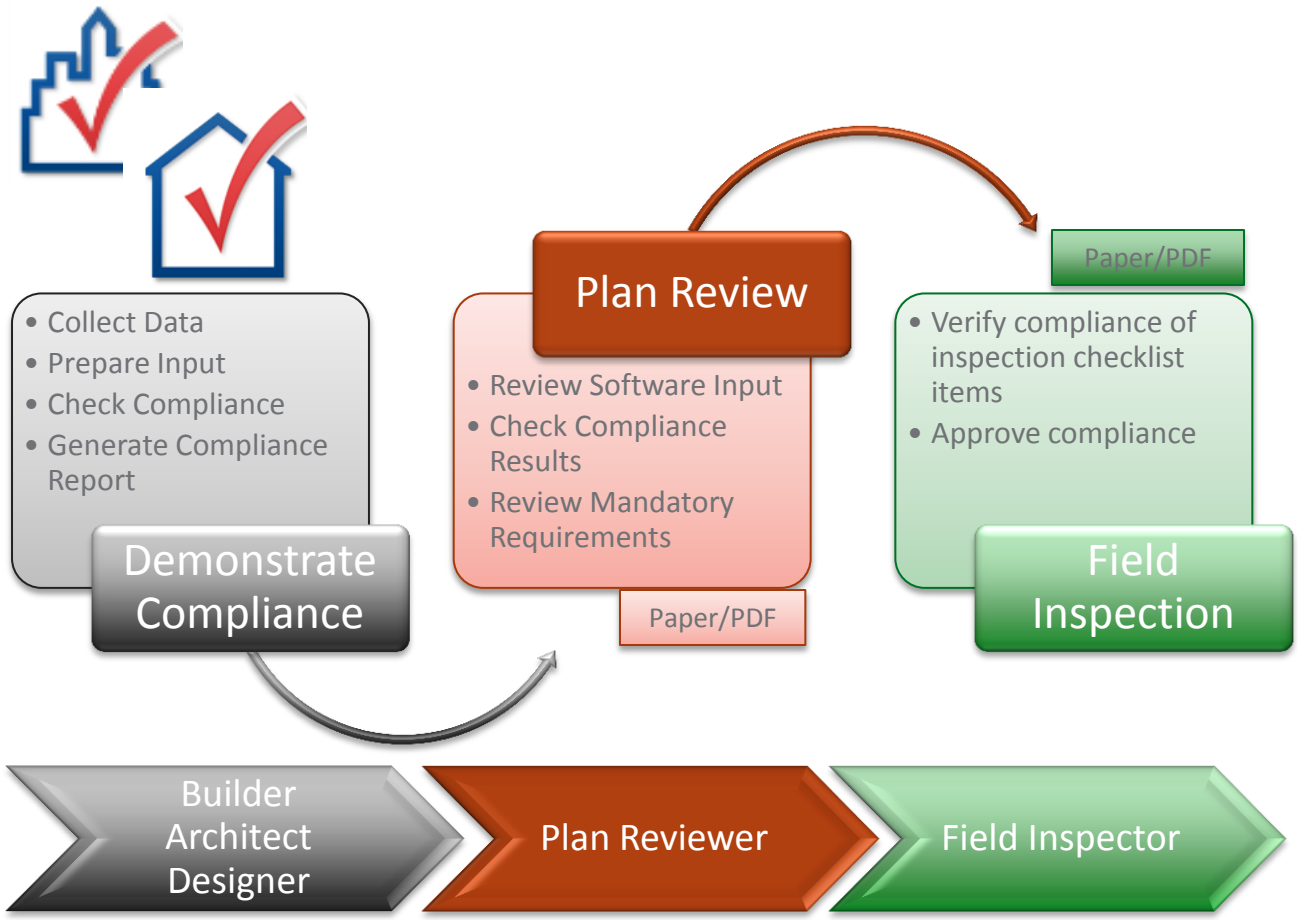
COMcheck:

- New York
- North Carolina
- Ontario (CA)
- Oregon
- Puerto Rico
- Vermont

REScheck:

- Florida
- Georgia
- Illinois
- New York
- North Carolina
- Puerto Rico
- Utah
- Vermont
- Washington
- Wisconsin

CheckTools Current Use Scenario



BECP Tools used only during “Demonstrate Compliance” Stage

Envelope Compliance Alternatives

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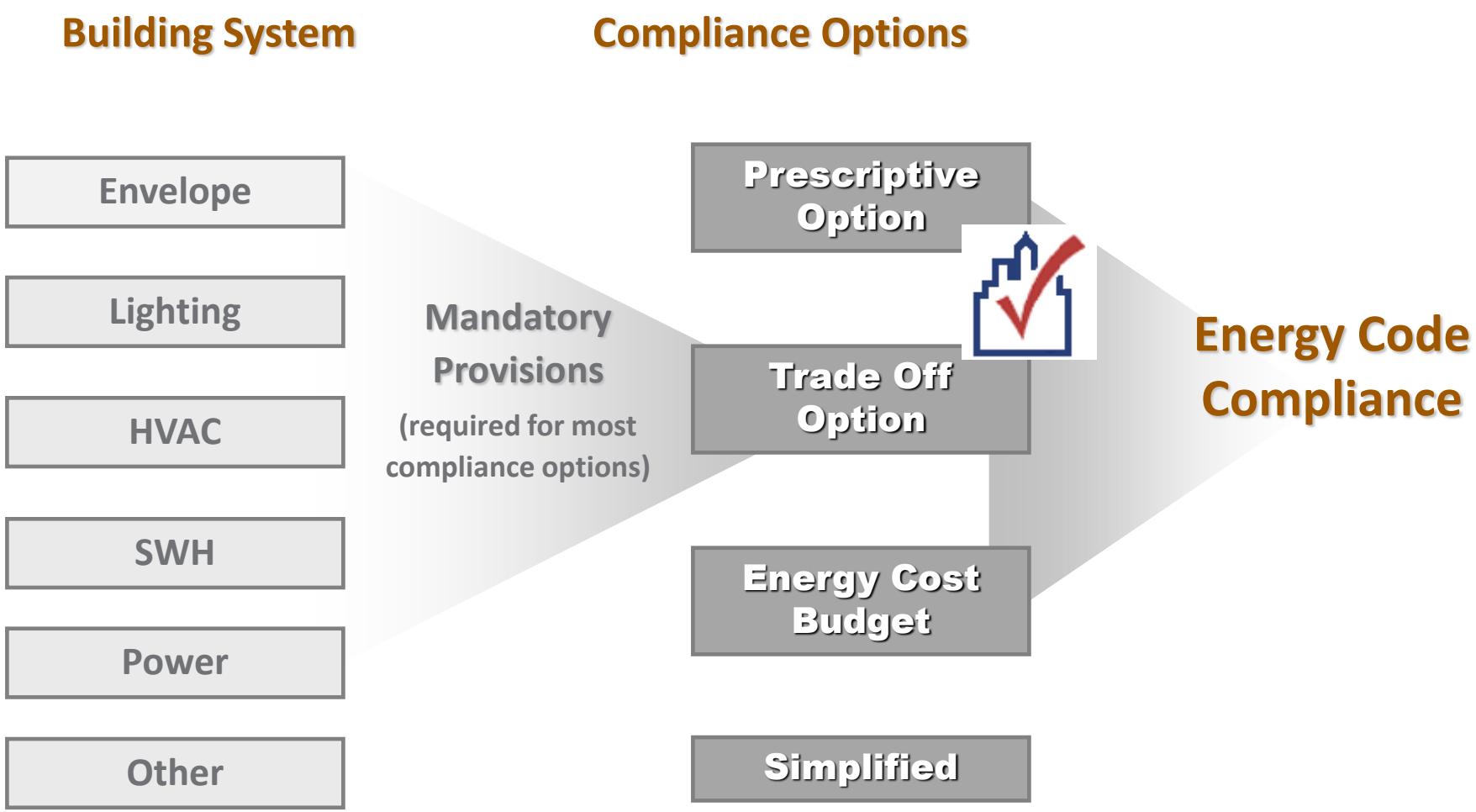
COMcheck:

- New construction and Additions:
  - Trade-Off:
    - ASHRAE 90.1 (Pre-2013) Normative Appendix C Methodology for Building Envelope Trade-Off Option
    - ASHRAE 90.1-2013 Appendix C has limited performance method (EnergyPlus)
    - 2015 IECC Component Performance Alternative (Total UA)
  - Prescriptive: Oregon
- Alterations: Prescriptive Only

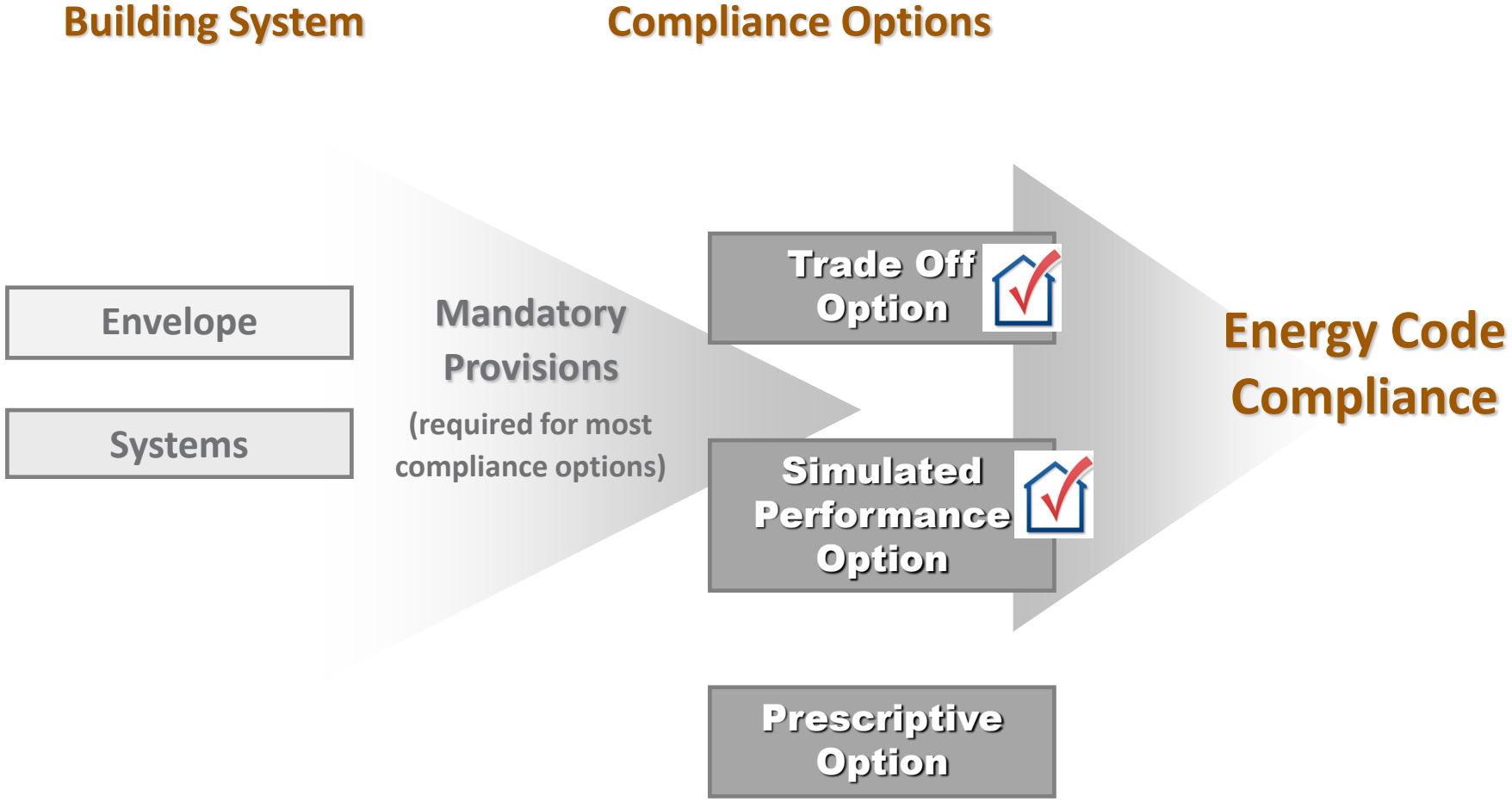
REScheck:

- New construction / Additions:
  - Total UA trade-off methodology
  - Limited performance methodology – DOE-2
- Alterations:
  - Total UA trade-off methodology
- 2015 IECC Additions/Alterations: Prescriptive alternative

COMcheck Compliance



REScheck Compliance



COMcheck

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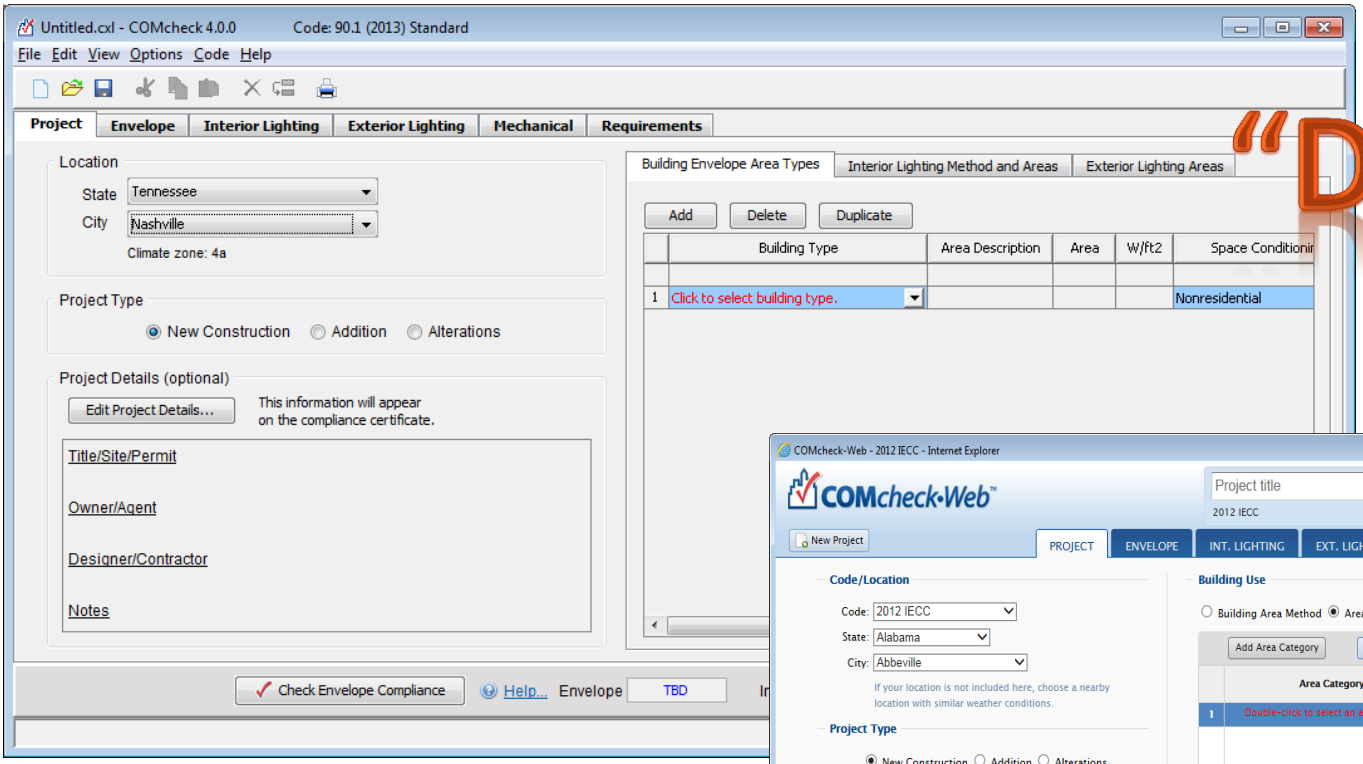
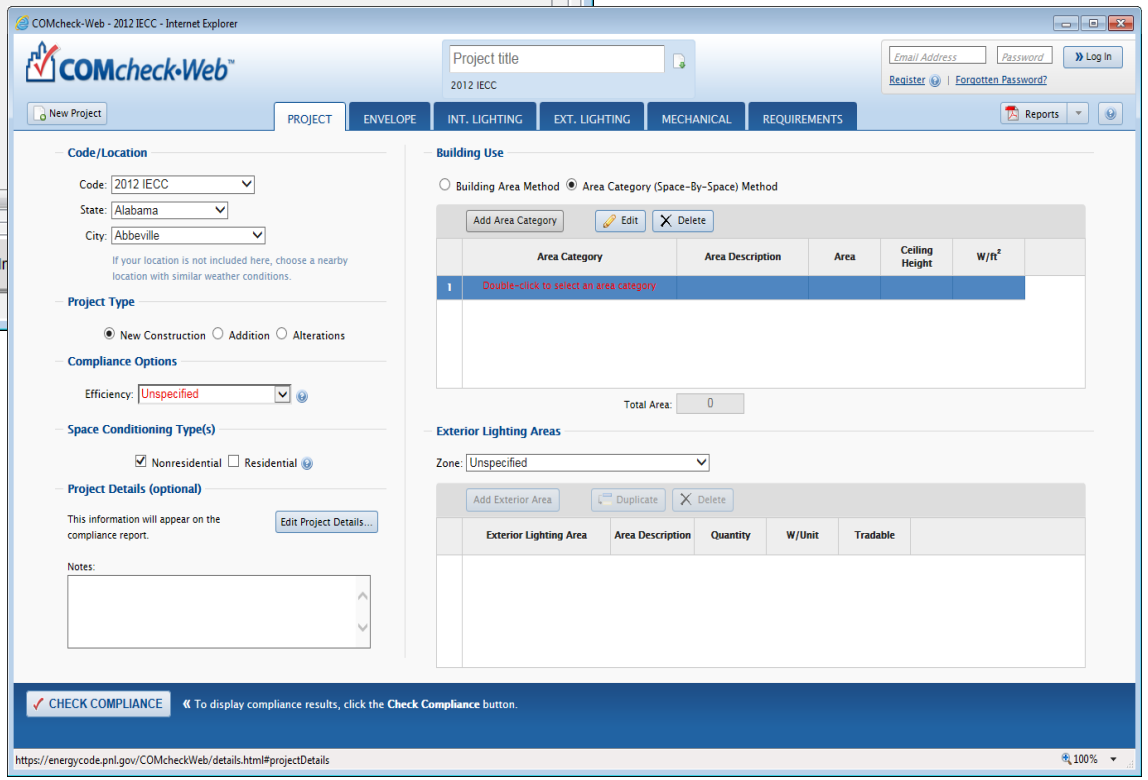


"DESKTOP"



WEB

REScheck

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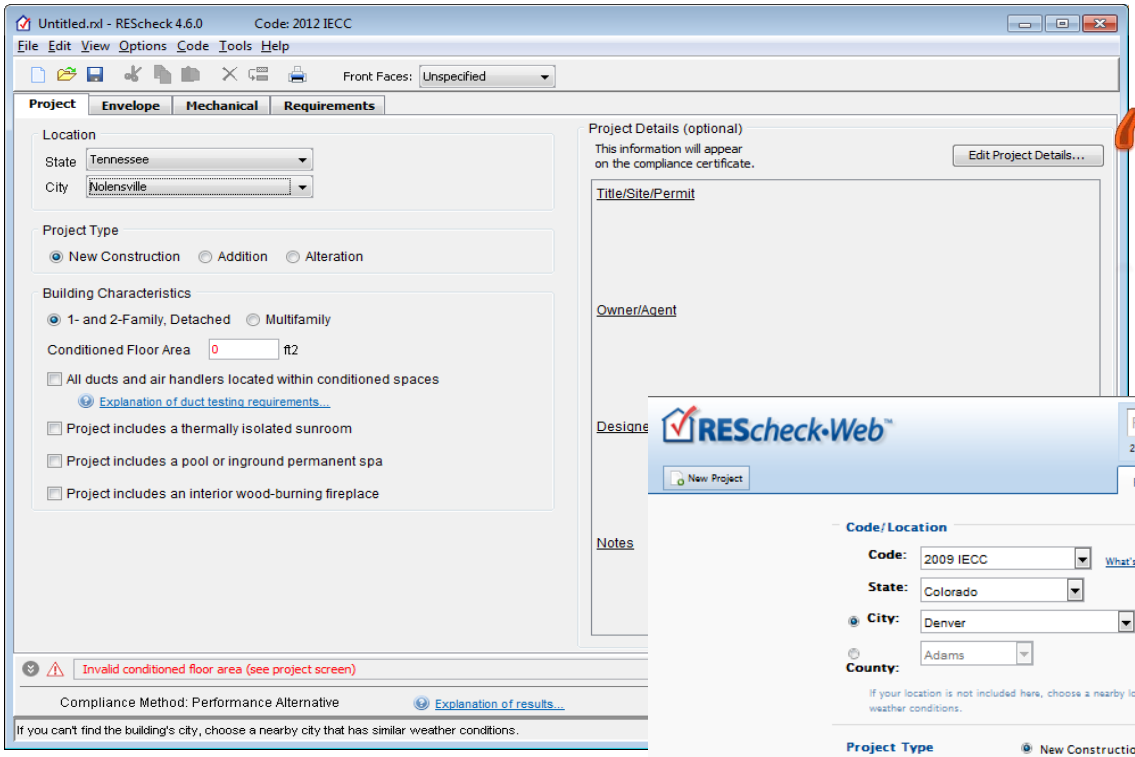
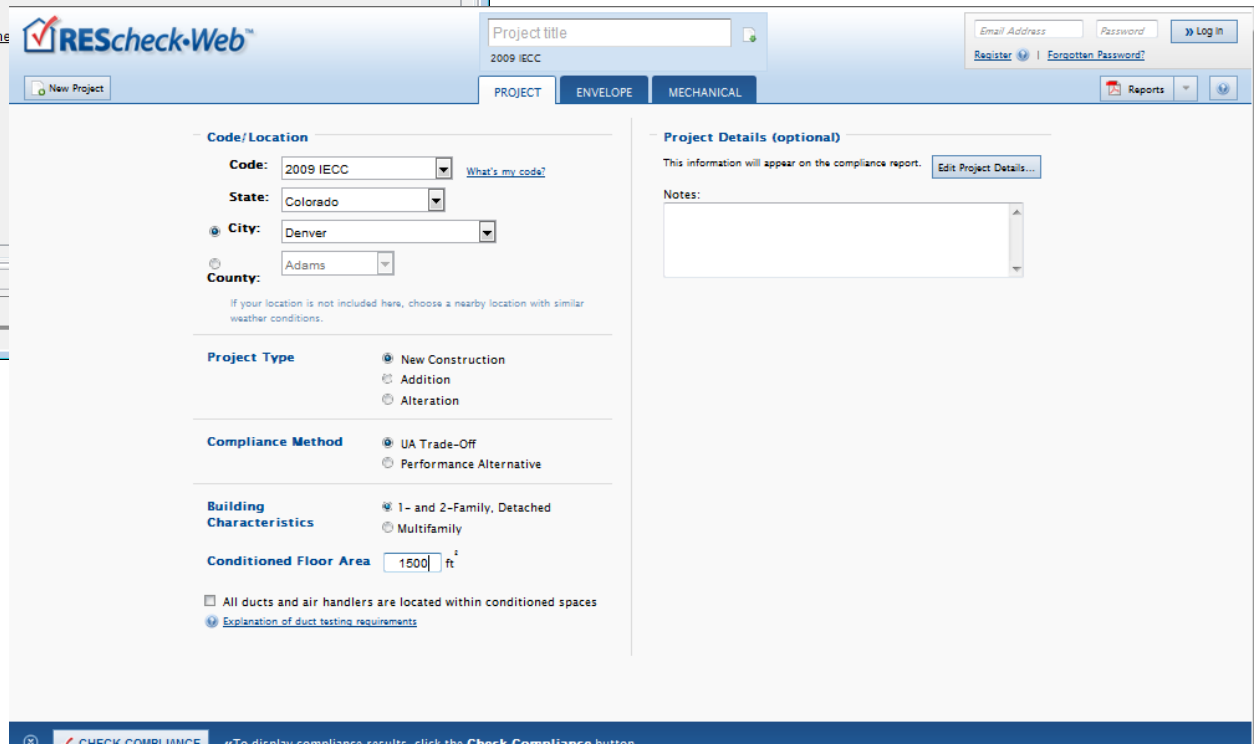


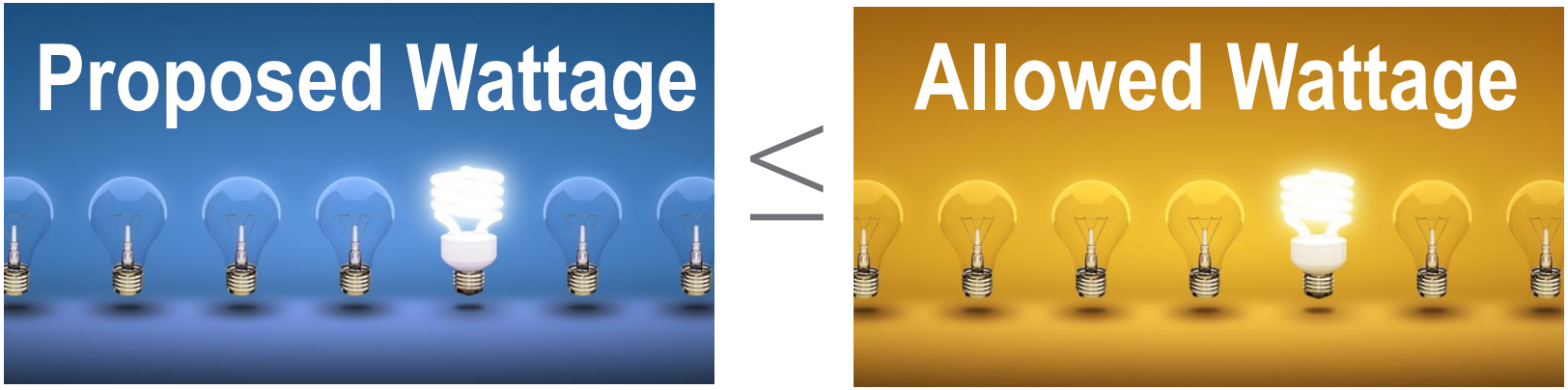
"DESKTOP"

WEB



COMcheck Interior / Exterior Lighting

- Mandatory requirements
- Lighting power requirements
  - Complies if total connected power is less than lighting power allowance (entire building or partial)

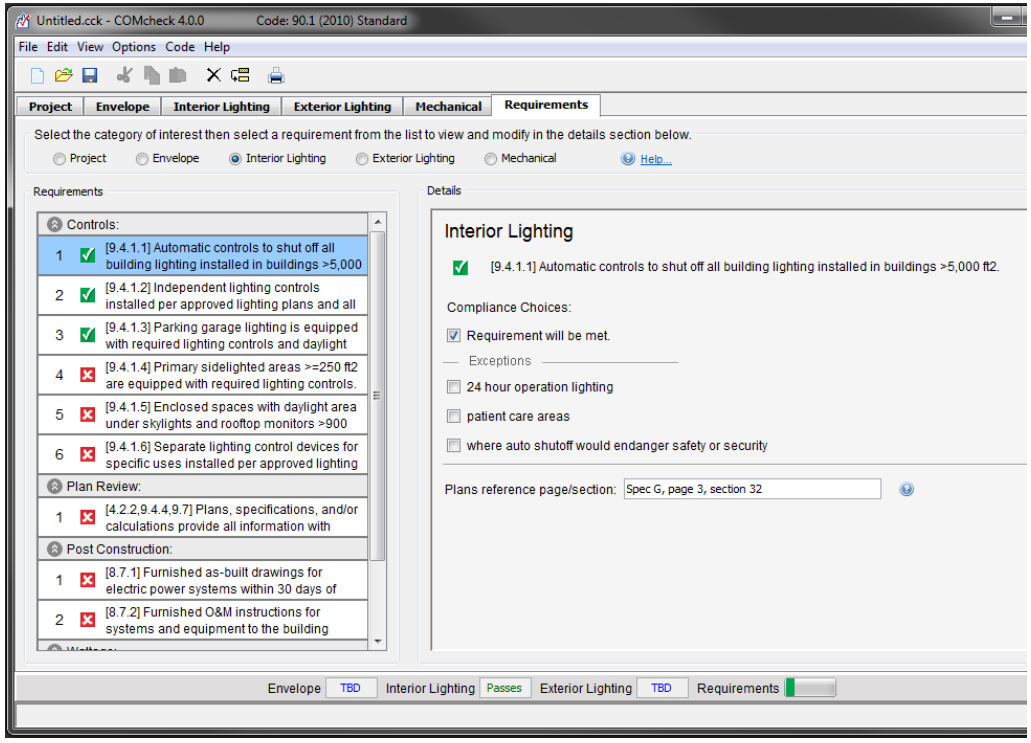


COMcheck Mechanical Equipment

- Different than Envelope and Lighting
- System types:
  - HVAC system
  - Plant
  - Water heating
- System inputs determine which requirements apply (“Customized” list of requirements)

Requirements Tab – Goals

- Ensure user is aware of applicable mandatory requirements and addresses each in the software
- Provide better documentation for code officials



Reports

COMcheck:

- Compliance Certificates
  - Envelope
  - Interior Lighting
  - Exterior Lighting
  - Mechanical

REScheck:

- Compliance Certificate
- Inspection Checklist
- Panel Certificate

Inspection Checklists organized by phase of inspection

- Plan Review
- Footing/Foundation
- Rough-in
- Final

Reports – Inspection Checklist

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COMcheck Software Version 3.9.2

Inspection Checklist

Requirements: 25.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

90.1 (2010) Standard	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
8.4.2 [EL10][2]	At least 50% of all 125 volt 15- and 20-Amp receptacles are controlled by an automatic control device.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
9.4.1.1 [EL1][2]	Automatic controls to shut off all building lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Spec G, page 3, section 32
9.4.1.2 [EL2][2]	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Spec G, page 3, section 32
9.4.1.3 [EL11][2]	Parking garage lighting is equipped with required lighting controls and daylight transition zone lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Spec G, page 3, section 32
9.4.1.4 [EL12][1]	Primary sidelighted areas >=250 ft2 are equipped with required lighting	☐Complies ☐Does Not	

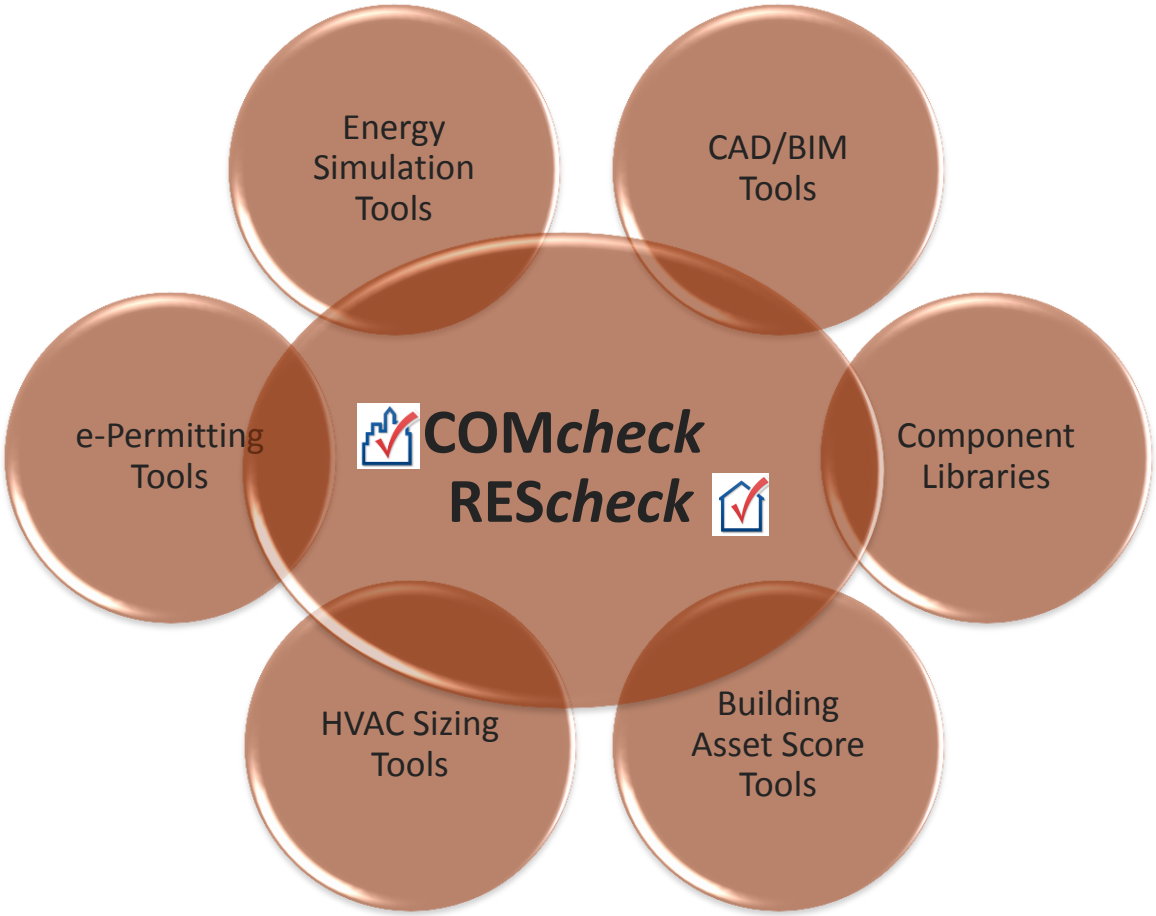
CheckTools Limitations

- "Deemed-to-comply" – Deemed to meet the intent of the code
- Prescriptive compliance capability limited
- Not all exceptions/allowances can be supported
- Nonstandard assembly types – U-factor calculations/documentation required
- Geometry/envelope design details limited
- Mechanical system configurations complex
- Energy code copyright constraints

Future Development

- More dynamic compliance: prescriptive->trade-off->performance: One-stop-shop
- Interoperability and standardization
- Reduce the “deemed-to-comply” provisions
- Customization of inspection checklists
- Statistical sampling process for selective compliance inspection
- More product library support: e.g. NFRC, lighting fixtures/products, etc
- Code official Mobile checklist access
- ePermitting

Compliance Tools Interoperability Potential



www.energycodes.gov

COMcheck Projects by State (3/2012 – 2/2015)

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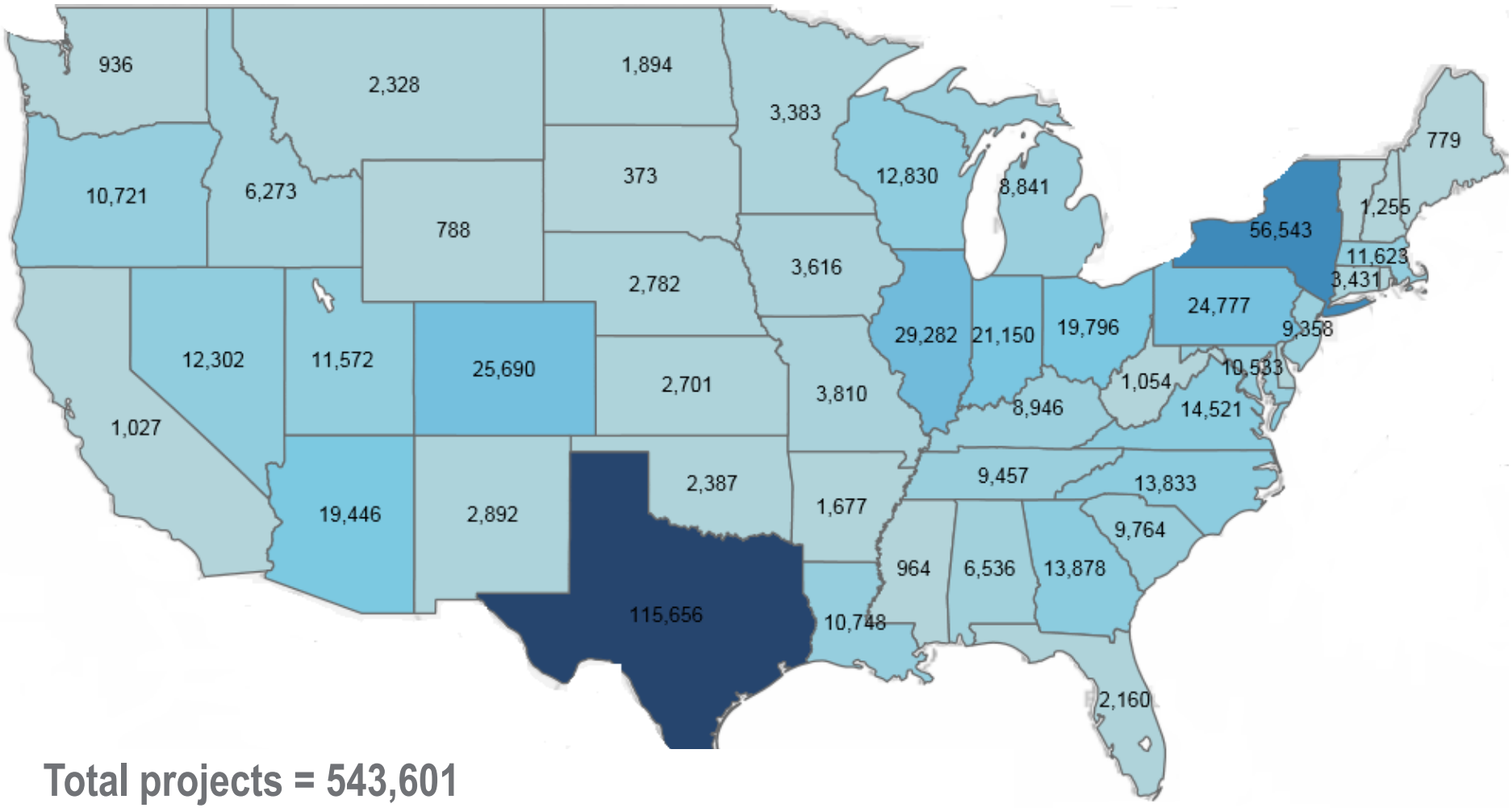
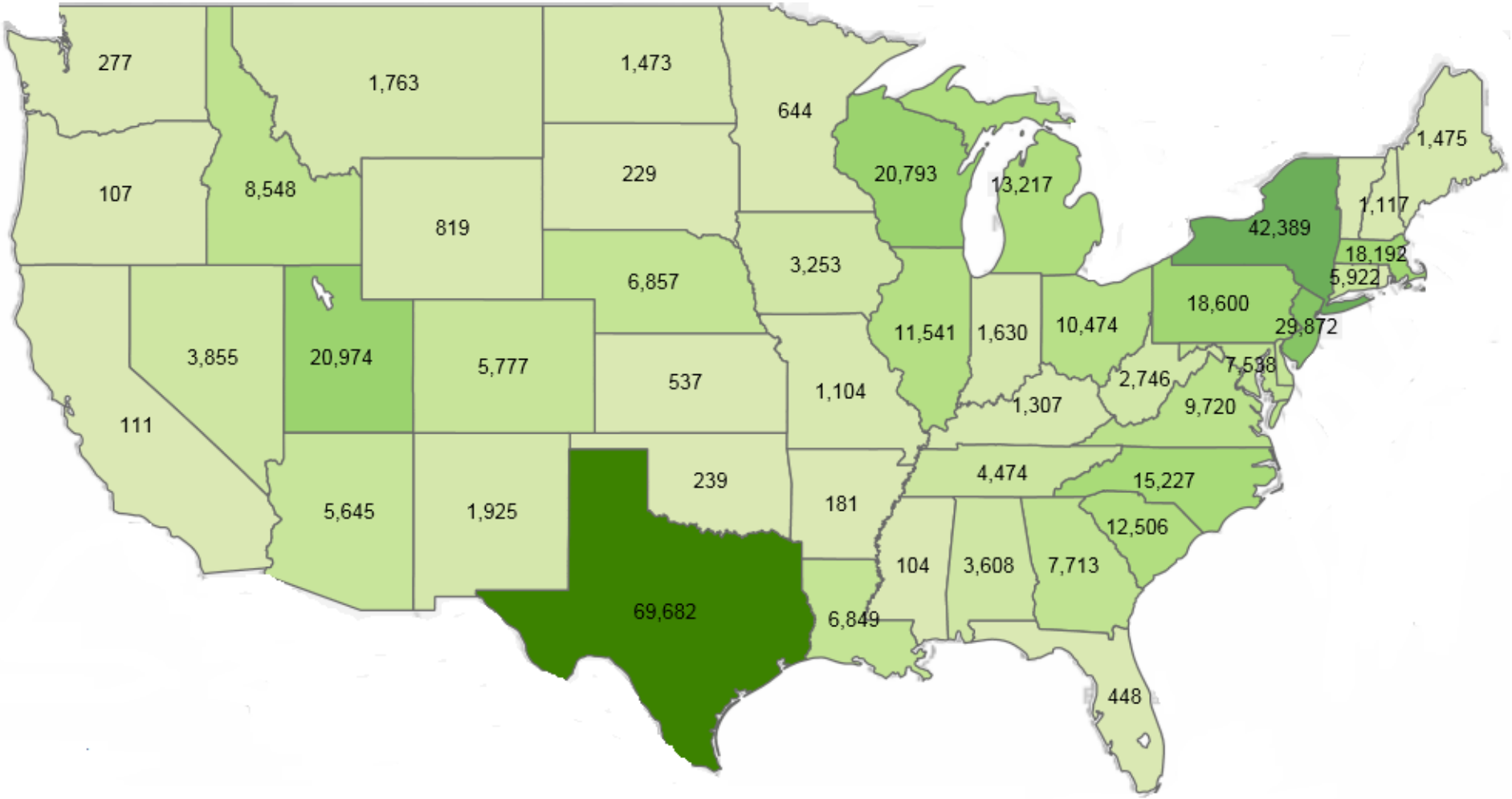


Total projects = 543,601

REScheck Projects by State (3/2012 – 2/2015)



Total projects = 417,361